

Innovative
Ground
&
Small Spacecraft
Operations

Dr. David J. Korsmeyer Intelligent Systems Division



MER Mission Ops Tools



MAPGEN: Activity plan development and analysis

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CIP: Customizable data navigation, search, and information management

All Software has been continuously operational for the Entire mission to date

MER science and uplink team members have estimated that overall science return increased by 20 - 50%.



navigation,

MERBoard: Collaborative information analysis and sharing



Viz: High fidelity terrain modeling and analysis

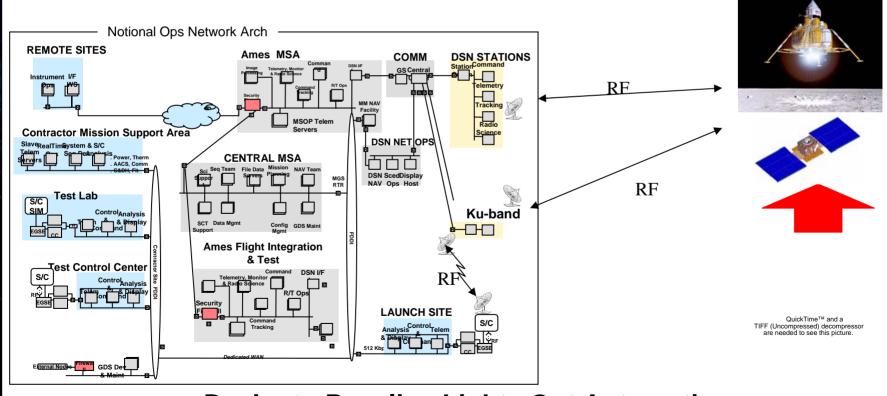


HCC & Fatigue
Countermeasures: Improved
data understanding and
Enhanced situational awareness



Mission Operations Elements

- 1. First 'Day' of operations using Ground-based Ops
- 2. DSN and Direct Ku-Band available for up and down
- 3. Transition to Lights Out Automation for Engineering Monitoring and Goal-based Science



Desire to Baseline Lights Out Automation



TAZ Fully Deployable Satellite Dish

- TAZ Specifications
 - 2.8 Meter Deployable KU Band Satellite
 Dish
 - 10 Deployable weatherproof Cases
 - Maximum bandwidth capacity(current modem is the limiting factor)
 - Approximately 5Mbps (Satellites capacity is 45Mbps) Down
 - Approximately 1.8Mbps Up



Advanced Mission Operations Systems

Scope: Ensemble/MCT are open platforms for the development, integration, and deployment of mission operations software based upon the Eclipse IDE. Java-based Eclipse IDE is a opensource platform for Tool development.

Multiple teams from various NASA centers developing Eclipse plug-ins and

extensions (ARC, JPL, etc)

Deliverables

- Deliver first wave of baseline mission tools based on Eclipse RCP (opensource Java IDE)
 - MER downlink analysis tools (JPL/Ames)
 - Phoenix Science Interface (Ames/JPL)
- Integrate existing additional tools with near-term mission pull
 - Viz 3d visualization environment
 - GIS based system (Worldwind)
- Extend tools for later missions such as Small Sats
 - Distributed planning and scheduling
 - Remote telemetry display and analysis
 - Model-based diagnosis systems

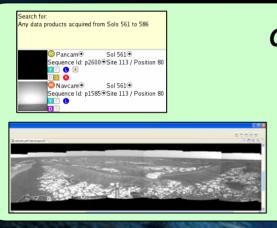


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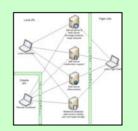


Ensemble Project

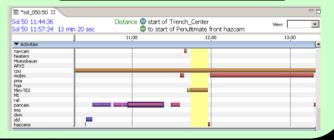
Ames Human System Integration, and Intelligent Systems Divisions, and JPL's Division 31 all jointly developing tools



Compatible Ensemble **Ops Components**



Duration	Energy	Critical Data	Total Data
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MER 2006: In Use

MSL 2009: Baselined

Phoenix 2007: Delivered

New Opportunities

JSC Bed Rest



Ames Small Satellites





Broad Participation of Toolkits

We can bring many existing tools to mission operations, reducing risk and cost.

